

001529277  
Rec'd PCT/PTO 25 MAR 2005

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization International Bureau



(43) International Publication Date  
8 April 2004 (08.04.2004)

PCT

(10) International Publication Number  
WO 2004/030425 A3

(51) International Patent Classification<sup>7</sup>: H05H 9/00

(21) International Application Number:

PCT/US2003/030646

(22) International Filing Date:

29 September 2003 (29.09.2003)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

60/414,300 27 September 2002 (27.09.2002) US

(71) Applicant (for all designated States except US): SCANT-ECH HOLDINGS, LLC [US/US]; 430 Tenth Street, N.W., Suite N-205, Atlanta, GA 30318 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): ZAVADTSEV, Alexandre, A. [RU/RU]; 161-4, Kotovskogo str, Reutov, Moscow Region, 143965 (RU). BOWSER, Gary, F. [US/US]; 2702 CR 68, Auburn, IN 46706 (US).

(74) Agent: COURSEY, R., Stevan; Troutman Sanders LLP, Suite 5200, 600 Peachtree Street, NE, Atlanta, GA 30308 (US).

(81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declaration under Rule 4.17:

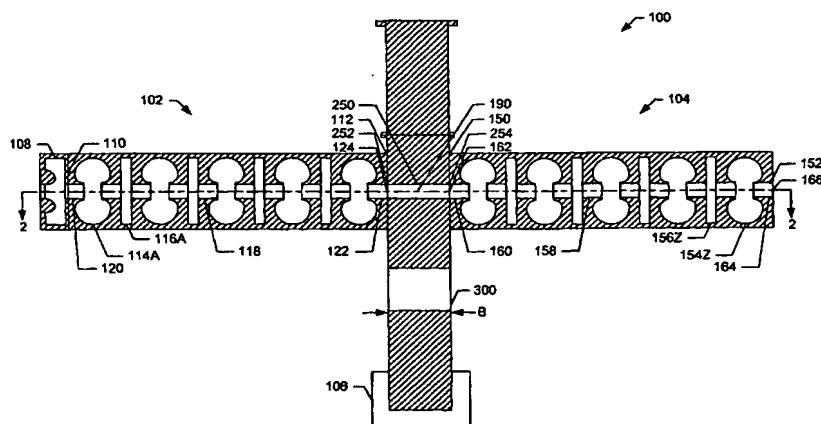
— of inventorship (Rule 4.17(iv)) for US only

Published:

— with international search report  
— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

[Continued on next page]

(54) Title: MULTI-SECTION PARTICLE ACCELERATOR WITH CONTROLLED BEAM CURRENT



(57) Abstract: A particle accelerator system, including apparatuses and methods, that is configurable through repositioning of shorting devices therein to operate at different charged particle beam currents while maintaining optimum transfer of electromagnetic power from electromagnetic waves to one or more accelerating sections thereof, and reducing or eliminating reflections of electromagnetic waves. The particle accelerator system includes at least two accelerating sections and an electromagnetic drive subsystem with portions of the electromagnetic drive subsystem being interposed physically between the accelerating sections, thereby making the particle accelerator system compact. The electromagnetic drive subsystem includes, among other components, a 3dB waveguide hybrid junction having a coupling window in a narrow wall thereof which is shared by the junction's rectangular-shaped waveguides. By virtue of the coupling window being positioned in a narrow wall rather than a wide wall, the maximal power of the 3dB waveguide hybrid junction is increased significantly.



(88) Date of publication of the international search report:  
8 July 2004

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/30646

**A. CLASSIFICATION OF SUBJECT MATTER**

IPC(7) : H05H 9/00  
US CL : 315/505, 500, 507, 501, 502-504

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)  
U.S. : 315/505, 500, 507, 501, 502-504

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  
NONE

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
NONE

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5.744,919 (MISHIN et al.) 28 April 1998 (28.04.1998), Figure 3	1

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier application or patent published on or after the international filing date	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&"	document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means		
"P" document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search

21 March 2004 (21.03.2004)

Date of mailing of the international search report

07 MAY 2004

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

Faxsimile No. (703)305-3230

Authorized officer

TUYET VO

Telephone No. 571 272 1830